

# Surgical Management of Keloids: A Comprehensive Scoping Review of Techniques and Clinical Outcomes

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## BACKGROUND

Keloids are fibroproliferative skin lesions characterized by excessive collagen deposition *extending beyond the original wound margins*. Despite numerous treatment modalities, recurrence after surgical management remains a major clinical challenge, prompting evaluation of which surgical approaches provide the most durable outcomes.

## OBJECTIVE

To systematically assess the **effectiveness, recurrence rates, and safety profiles** of surgical-based keloid interventions, including:

- Excision alone
- Excision + intralesional corticosteroids
- Excision + postoperative radiotherapy
- Cryo-assisted surgery
- Laser-assisted excision

## METHODS

Comprehensive search conducted from inception to **January 2025**.

PubMed Embase Scopus Web of Science  
Cochrane

**Eligibility:** RCTs, non-randomized trials, prospective/retrospective cohorts, and case series with  $\geq 10$  participants evaluating surgical keloid interventions.

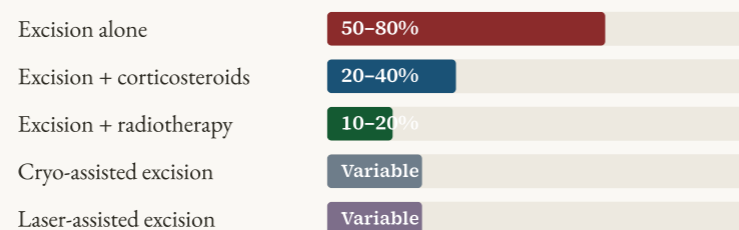
**Exclusions:** Case reports, narrative reviews, conference abstracts without extractable data, non-surgical treatments.

*Per scoping methodology: no meta-analysis or formal risk-of-bias scoring performed; limitations narratively mapped.*

## RESULTS – STUDY CHARACTERISTICS

<b>RECORDS IDENTIFIED</b> <b>2,314</b> Across all databases	<b>STUDIES INCLUDED</b> <b>58</b> Met full inclusion criteria
<b>RECURRENCE DEFINITIONS</b> <b>14</b> Distinct definitions identified	<b>FOLLOW-UP RANGE</b> <b>3–84 mo</b> Across included studies

## RECURRENCE RATES BY INTERVENTION



\* Bar length proportional to midpoint of range. Variable = insufficient consistent data.

## KEY FINDINGS

- **Excision alone** showed consistently high recurrence (50–80%)
- **Corticosteroid adjunct** reduced recurrence to 20–40%; dosing varied widely
- **Radiotherapy** yielded the most favorable outcomes (10–20%)
- Fewer than **half of studies** used validated scar assessment tools
- Adverse events, when reported, were generally **mild**

## METHODOLOGICAL OBSERVATIONS

Substantial heterogeneity across studies. Patterns suggest **moderate to high risk of bias** driven by:

<b>Study Design</b> Predominantly retrospective; limited prospective data	<b>Follow-up</b> Incomplete; often <12 months for newer techniques
<b>Sample Size</b> Frequently small cohorts; underpowered analyses	<b>Outcomes</b> 14 distinct recurrence definitions identified
<b>Scar Tools</b> <50% used validated assessment instruments	<b>Sampling</b> Unclear methods in majority of studies

## RESEARCH GAPS IDENTIFIED

- Absence of a universally accepted recurrence definition across surgical keloid literature
- Lack of long-term prospective trials with standardized protocols and outcome measures
- Inconsistent adverse event documentation limiting safety profile comparisons
- Insufficient patient-reported outcomes and quality of life data across intervention types

## FUTURE DIRECTIONS

- Consensus-based recurrence definitions for keloid surgery
- Prospective RCTs with uniform reporting frameworks
- Long-term follow-up studies ( $\geq 24$  months) across all interventions
- Validated scar tools (VSS, POSAS, MSS) as standard endpoints

## CONCLUSION

Evidence mapping demonstrates that surgical keloid management is *highly variable*, with combination strategies — particularly *excision plus radiotherapy or corticosteroids* — most consistently associated with reduced recurrence.

Methodological inconsistencies, limited long-term data, and heterogeneous outcome reporting *limit comparability* across studies.

These findings highlight the need for *standardized recurrence definitions*, uniform reporting frameworks, and prospective trials to establish optimal surgical protocols.

This scoping review provides the *foundational evidence landscape* necessary to inform a future full systematic review and advance evidence-based keloid surgical care.

## ABSTRACT

Keloids represent a persistent clinical challenge characterized by excessive fibroproliferation beyond wound margins. This scoping review systematically evaluated surgical-based interventions across 58 studies drawn from 2,314 records, identifying significant variability in technique, outcome reporting, and follow-up duration. Excision combined with radiotherapy demonstrated the lowest recurrence rates (10–20%), while excision alone showed rates of 50–80%. The 14 distinct recurrence definitions identified across studies underscore the urgent need for methodological standardization. This review establishes the evidence base for a future full systematic review.

## DISCLOSURES & ACKNOWLEDGEMENTS

No conflicts of interest to declare. Add funding sources, acknowledgements, or IRB information here as applicable.